

COMMERCIAL WASTE DISPOSAL ASSESSMENT REPORT

FOR YEAR 2000



**BUREAU OF WASTE PREVENTION,
DIVISION OF PLANNING AND EVALUATION**

NOVEMBER 2002

Commercial Waste Disposal Assessment Report

YEAR 2000

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EXECUTIVE SUMMARY

In the *Beyond 2000 Solid Waste Master Plan*, the Department of Environmental Protection (DEP) identified commercial waste reduction as one of the priority areas that DEP will focus on to achieve its 2010 waste reduction goals. In fact, DEP believes that the greatest waste reduction gains over the next decade will come from the commercial sector.

To better inform Master Plan implementation, DEP developed this *Commercial Waste Disposal Assessment Report*. This analysis provides estimated commercial sector and material disposal rates and tonnages. Because this analysis focused on amounts disposed, it does not account for recycling or source reduction activities undertaken by individual businesses. The estimates in this report are based on multipliers developed by the California Integrated Waste Management Board (CIWMB) used in combination with Massachusetts employment data. Therefore, while the numbers are helpful for broad program planning purposes, they should not be relied upon for specific program development. In addition, because this data is based on an extrapolation from California, it is not intended to replace the data on commercial disposal reported in the Massachusetts Solid Waste Master Plan Progress Reports. When newer employment data become available, the analysis and the data in the attached *Appendices* can be updated and we can begin to determine waste disposal trends over time for both industry groups and specific materials.

Top Five Materials Disposed in 2000

According to the analysis, the top five materials disposed across all industries in 2000 were:

1. Paper: 1,143,100 tons
2. Food: 762,500 tons
3. Other Organics¹: 461,800 tons
4. Construction and Demolition Debris: 424,100 tons
5. Cardboard: 273,600 tons

These top five materials made up an estimated 3,065,100 tons, or 74%, of the total estimated materials disposed by the commercial sector in 2000². Some of these materials (such as paper and cardboard) were disposed in large amounts by most industry groups, while others (such as food waste) were concentrated in just a few industry groups.

¹ Other organics includes leaves, trimmings, brush, and other yard waste.

² Estimated disposal figures have been rounded to the nearest hundred in both the executive summary and the Report.. Appendices A-G provide detailed estimates for Industry Groups and Material Categories.

Top Five Industries By Amount Disposed in 2000

The top five industries in terms of estimated amount disposed in 2000 were:

1. Restaurants: 620,300 tons
2. Medical/Health Services: 516,400 tons
3. Business Services: 475,400 tons
4. Construction: 428,400 tons
5. Other Retail: 308,100 tons

These five industries were estimated to have disposed a total of 2,348,600 tons of materials in 2000. This is 57% of the total estimated tons disposed by all industry categories within this analysis.³ Most of the top five materials of the above listed industries have the potential to be recycled, composted or both.

The following table shows the *Top Ten Potential Target Areas for Waste Reduction*⁴. These target areas were based on material disposal amounts per Industry Group in 2000. While this table only shows 36 percent of the total estimated statewide disposal amount, it is helpful because it highlights opportunities to focus waste reduction programs on specific industry groups and material types to get the most “bang for our buck.”

| Top Ten Potential Target Areas for Waste Reduction | | | |
|--|-------------------------------|---------|------------|
| Material Type | Industry Group Name | Amount | % of Total |
| Food | Retail Trade - Restaurants | 347,400 | 8.4 % |
| Paper | Service - Medical/Health | 220,000 | 5.3 % |
| C&D | Construction | 169,200 | 4.1 % |
| Paper | Services - Business Services | 162,600 | 3.9 % |
| Paper | Retail Trade - Restaurants | 118,500 | 2.9 % |
| Food | Retail Trade - Food Store | 110,700 | 2.7 % |
| Paper | Retail Trade - Other | 85,300 | 2.1 % |
| Textiles | Services - Business Services | 78,900 | 1.9 % |
| Other Organics | Service - Medical/Health | 72,300 | 1.8 % |
| Paper | Services - Other Professional | 72,000 | 1.7 % |

³ Total tons of materials disposed by all industry groups in 2000 was estimated at 4,125,900 tons.

⁴ The amounts in this chart show the total estimated amount of that material type disposed of by that industry group for 2000. The “% of Total” column refers to the percent of the overall estimated commercial disposal of 4,125,900 tons.

INTRODUCTION

In the *Beyond 2000 Solid Waste Master Plan*, the Department of Environmental Protection (DEP) identified commercial waste reduction as one of the priority areas that the Agency will focus on to achieve its 2010 waste reduction goals. DEP believes that the greatest waste reduction gains over the next decade will come from the commercial sector.

To support the Solid Waste Master Plan, DEP developed this *Commercial Waste Disposal Assessment Report*. DEP will use this report to better plan its commercial waste reduction activities and programs. This report is intended to help answer questions such as:

- Which material categories represent the greatest portion of the commercial waste stream?
- Which business groups dispose of which material categories?
- To which business sectors should DEP and its partners direct its resources to achieve the greatest waste reduction gains?

This report will help to focus DEP's limited efforts and resources on commercial sector recycling/waste reduction, and identify areas where further research and analysis is needed. This report is not intended to replace Solid Waste Master Plan data on commercial waste disposal, but rather to supplement that data to better inform program planning.

METHODOLOGY

This report provides a snapshot in time of types and estimated amounts of materials disposed by the commercial sector. This analysis was based on the methodology used by the California Integrated Waste Management Board (CIWMB) in 1999 for its *Waste Characterization Study*⁵ and on the waste composition data obtained through that study. CIWMB contracted with several parties to perform in-depth waste sampling activities at generator locations and through self-hauling waste activities. Over 1,200 samples (waste sorts) were performed for all types of businesses throughout the state. These businesses were categorized into 25 industry groups that included 59 2-digit SIC code business types. The results of the study included a disposal rate per employee and a set of waste composition percentages for basic material categories and sub-materials within these categories for each of the 25 industry groups⁶.

This report uses the industry disposal rates, material categories and waste disposal percentages, and industry categories from the CIWMB study. Massachusetts employment data for 2-digit SIC business categories was used to establish employment numbers for each of the 25 industry groups.

⁵ It should be noted that the majority of published waste characterization studies have been based on waste disposed rather than waste generation amounts. This is because these studies are often based on waste sorts of co-mingled truck loads entering a disposal facility and therefore do not account for any recycling/diversion efforts made by businesses prior to disposal.

⁶ Nine basic material categories were defined for the CIWMB study along with 56 sub-material categories. The study performed was comprehensive and identified a complete list of disposal rates and material percentages for over 90% of 2-digit SIC code business categories. In addition, a margin of error within a 90% confidence level was calculated for all sub-materials for each industry group. For more detailed information on CIWMB's methodology and the waste disposal multipliers developed by CIWMB's work, please see its 1999 Study at <http://www.ciwmb.ca.gov/WasteChar/Study1999>.

This employment data is combined with the waste composition percentages from the CIWMB study to estimate waste composition and disposal in Massachusetts by industry group (see *Appendices A-C* for categorization of MA businesses into industry groups, and estimated waste disposal amounts). An example of the basic calculations used in this report to determine material disposal estimates is illustrated below:

**To Calculate Estimated Waste Disposed by Industry Group #02:
Retail Trade – Restaurants for Year 2000**

(Includes 2-digit SIC code 58: Eating and drinking places)

Total average yearly employment number for all 2-digit business categories in the Industry group in Year 2000 multiplied by the estimated disposal rate (tons per employee per year):

$200,087 \text{ people} * 3.1 \text{ tons/year} = 620,270 \text{ tons per year of estimated waste disposed in 2000.}$

**To Calculate Estimated Amount of Corrugated Cardboard (OCC)
Disposed by Industry Group #02: Retail Trade – Restaurants for
Year 2000**

Total estimated waste disposed multiplied by estimated disposal percentage for a specific material (OCC) for a specific Industry Group (#02: Retail Trade – Restaurants):

$620,270 * 5.9\% = 36,596 \text{ estimated tons of UCC disposed by Industry Group: Retail Trade – Restaurants in 2000.}$

These calculations were performed for each industry group and for every material and sub-material included in CIWMB's report. The analysis is broken down by individual industry groups and by material categories, and highlights the following information:

- The industry groups that employ the most people.
- The waste composition of the industry groups that generate the most waste.
- The material categories that compose the greatest portion of the waste stream.
- The top ten industry group/material combinations to target for increased recycling or waste reduction.

In addition, the *Appendices* include more comprehensive, detailed information across all material categories and industry groups. When reviewing this analysis it is important to keep in mind the following caveats:

1. Basic Methodology Caveats

- The material percentages developed in the CIWMB study are for materials disposed – not generated - by businesses. This is important to note because these percentages do not take into consideration recycling/waste diversion activities implemented by businesses prior to disposal.

- ▶ Due to rounding differences that occur between categorizing disposal amounts by industry groups, material types, and detail of disposal breakdowns, there may be a small difference of the total tonnage calculated within the *Appendices* section. Estimated disposal figures have been rounded off to the nearest hundred within the report and *Executive Summary*. Estimated Disposal figures in the *Appendices* were not rounded to provide the reader with original estimates for each business group and for each material and sub-material.
- ▶ Because the waste composition percentages are the same across all individual business categories within industry groups (*e.g.*, both “apparel and accessory stores” and “furniture, home furnishings and equipment” are included within the industry group “Retail Trade – Other”), it is not possible to distinguish differences between business categories within the larger industry groups.
- ▶ Although this report does include the total number of business establishments per 2-digit SIC code or industry group for 2000 (see Appendix H), we have not attempted to gather more detailed industry data at this time. Furthermore this report does not attempt to breakdown business into more specific 4-digit SIC code listings for two reasons: a) this was not done in the CIWMB study, and b) total employment data is very difficult to obtain at such a specific SIC code level (often times this information is considered confidential and is not publicly available).
- ▶ There is some uncertainty within some material categories that limits our ability to draw specific conclusions from the analysis. For example:
 - The sub-material category, Textiles, was included under the material category Other Organics. This sub-material category does not differentiate between natural and man-made fibers or coated materials.
 - Electronics were included within both the Metal and Plastic material categories under remainder/composite metal or durable plastic (depending on the item); therefore it is impossible to estimate electronics alone.

2. Caveats Extrapolating from California to Massachusetts

- ▶ Since this methodology does not account for recycling, composting or other waste reduction activities, differences in these activities between California and Massachusetts (either statewide or for specific business categories) were not taken into account and may have affected the results.
- ▶ DEP expanded the basic material category listing from 9 material types (used by CIWMB) to 15 material types by breaking out textiles, food, plastic film, corrugated cardboard, and containers from the broader material groupings listed.
- ▶ Organic material percentages were not adjusted for differences in growing seasons between California and Massachusetts, since no information was available at the time of the analysis to make an accurate adjustment.
- ▶ The CIWMB study did not indicate the portion of businesses sampled that had cafeterias or maintained on-site food preparation facilities. From other work being performed by DEP it appears that there may be a trend among large businesses in the Northeast to eliminate employee cafeterias and on-site food preparation.
- ▶ There may be major differences between construction materials used in Massachusetts versus California, which are not reflected in this report.

ANALYSIS BY INDUSTRY GROUP

This section summarizes employment data and waste composition data by industry group. DEP used the CIWMB disposal rates per employee by industry group and individual industry group material disposal percentages in conjunction with Massachusetts employment data for calendar year 2000⁷ as the basis for developing estimated waste composition percentages.

Employment Information

Total employment reported for businesses at the 2-digit SIC code level in Massachusetts for calendar year 2000 was 3,241,396. This includes both private and public sector employment. Private sector employment covered reported self-employed persons and companies, while the public sector consisted of Federal, State, and locally employed persons. This analysis covered 59 2-digit SIC code business categories with an aggregate employment of 2,926,140, or 90% of the total number of people employed in Massachusetts in 2000. Due to confidentiality status for certain employment sectors and activities, a small number of employment sectors did not report numbers employed on a 2-digit SIC code level. These sectors report total employment on a larger 1-digit SIC code level and were not used for this analysis.

DEP used the CIWMB industry group categories to categorize the 59 Massachusetts 2-digit SIC code business groups for this analysis. A listing of all the industry group categories and associated 2-digit SIC code businesses is located in *Appendix A*.

Top Five Employment Industries

The top five employment industries in Massachusetts for 2000 were:

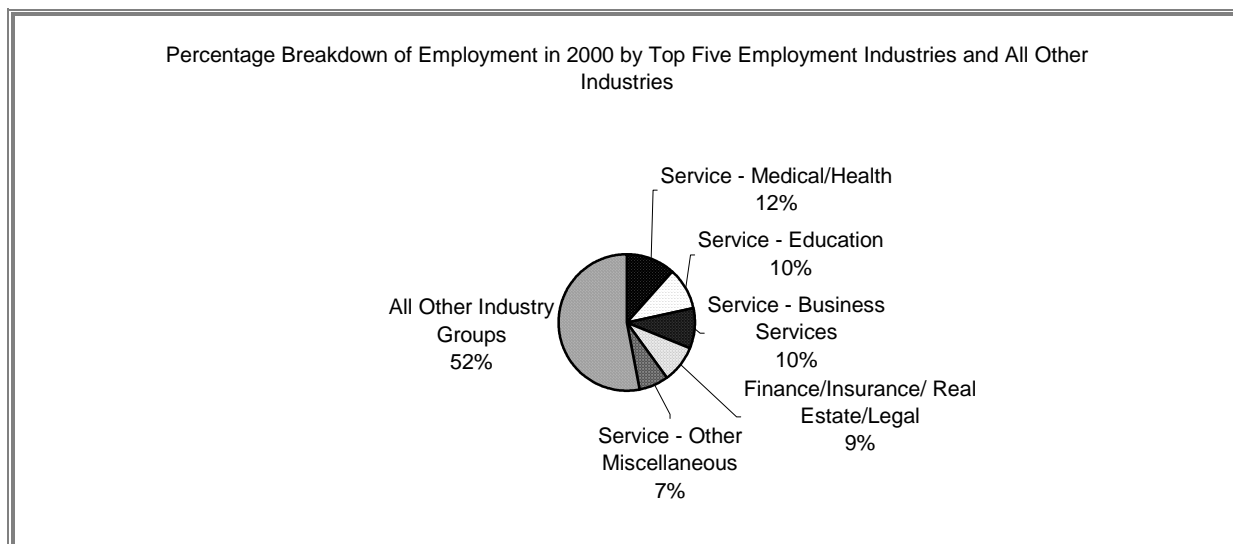
1. Service – Medical/Health: 344,286 employed
2. Service – Education: 289,265 employed
3. Service – Business: 279,621 employed
4. Finance/Insurance/Real Estate/Legal: 254,822 employed
5. Service – Other Miscellaneous: 206,291 employed

This data shows that the Massachusetts economy in 2000 was heavily based on a service economy, as all five top employment industries in 2000 were service-oriented. Together these industry sectors employed a total of 1,374,285 persons, accounting for 42% of the total Massachusetts employment and 47% of total employment covered in this analysis.

Medical/Health Services was the largest employment industry, accounting for 25% of the total number of persons employed among the top five employment sectors.

⁷ Source of information was Massachusetts Department of Employment and Training.

Figure 1



Top Five Industries by Amount Disposed

The top five industries in Massachusetts in terms of amount disposed⁸ in 2000 were:

1. Retail Trade – Restaurants: 620,300 tons disposed
2. Service – Medical/Health: 516,400 tons disposed
3. Service – Business Services: 475,400 tons disposed
4. Construction: 428,400 tons disposed
5. Retail Trade – Other: 308,100 tons disposed

These five industries disposed a combined total of 2,348,600 tons of materials in 2000. This is 57% of the total estimated tons disposed by all industry categories within this analysis.⁹ *Figure 3* shows a comparison of the top five waste disposers with All Other Industry Groups. Interestingly, the top five disposal industries included only two of the top five employment industries (Service – Medical/Health and Service – Business Services).

⁸ As noted previously in this Report, the estimated disposal figures in the Report have been rounded to the nearest hundred. All estimates are presented in number of tons disposed.

⁹ The total amount disposed by all industry groups in 2000 was estimated at 4,125,900 tons.

Figure 2

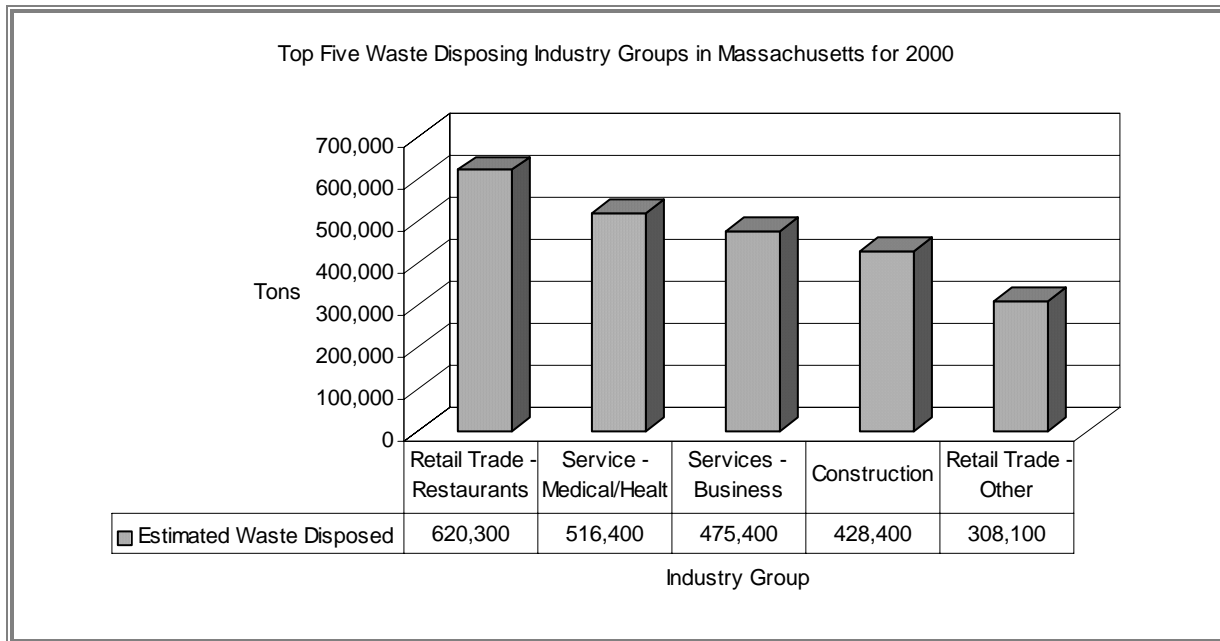
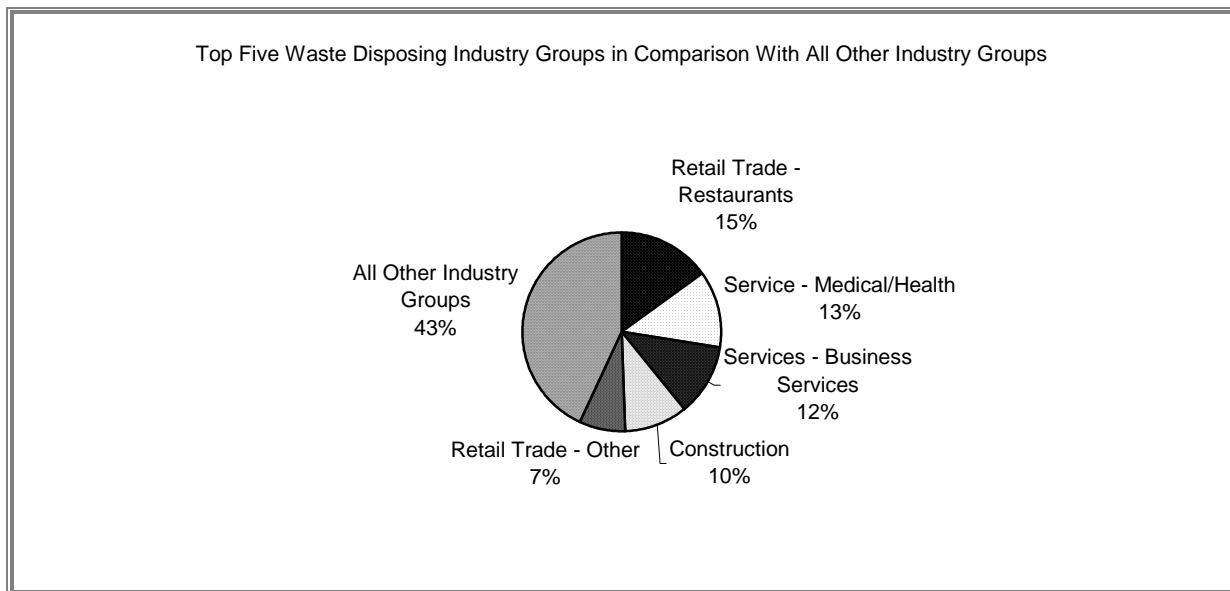


Figure 3



Since these top five industry groups accounted for almost 60% of the total commercial waste disposed in 2000, DEP looked more closely at each of the top five disposers and analyzed the estimated types and amounts of materials being disposed.

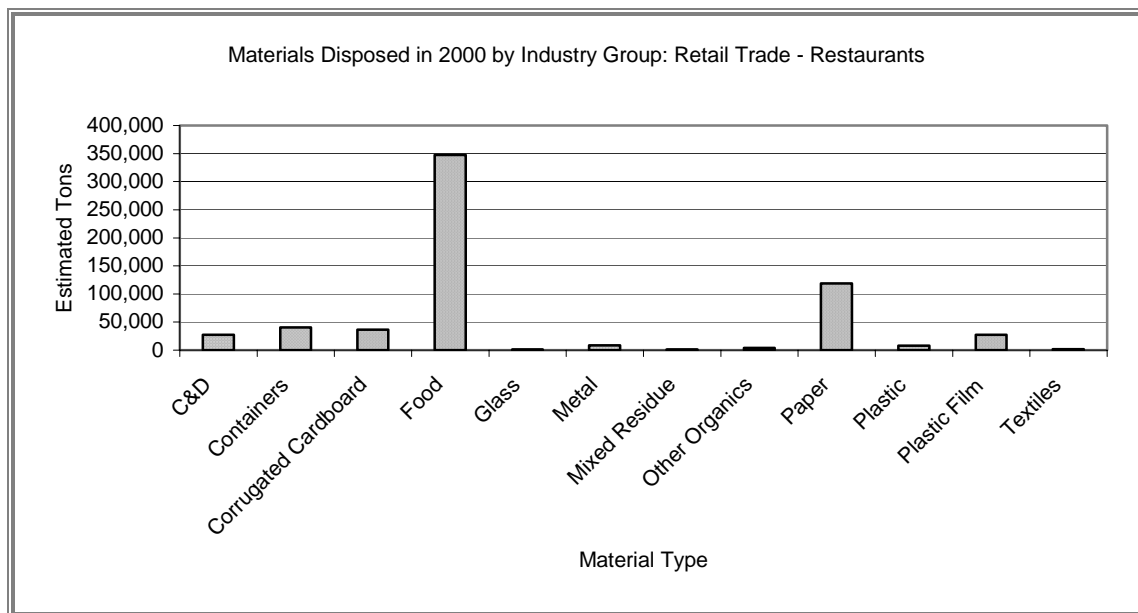
Retail Trade - Restaurants

The industry group *Retail Trade – Restaurants* employed 200,087 people in 2000 and disposed a total of 620,300 tons of materials. The top five materials that this industry group disposed of were:

1. Food: 347,400 tons
2. Paper: 118,500 tons
3. Containers: 40,300 tons
4. Corrugated Cardboard: 36,600 tons
5. C&D: 27,300 tons

Figure 4 shows the relation of the top five materials disposed to all other materials found in this industry's waste stream.

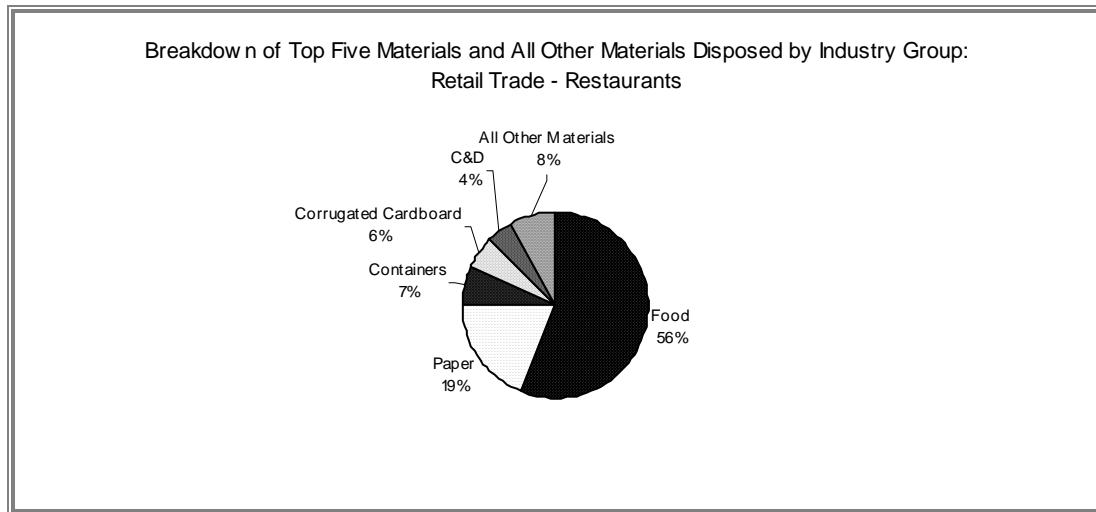
Figure 4



The top five materials made up 570,100 tons, or 92% of the estimated amount of materials disposed in 2000 by restaurants. The two largest material components, food and paper, are compostable and therefore have a potential to be diverted into a composting feedstock rather than disposed. In addition, the last three materials, corrugated cardboard, containers, and C&D, are often readily recyclable. Further study into the specific make up of the type of food waste (*e.g.*, meat, vegetables, grains) and paper currently being disposed would help to determine what estimated amounts of these materials could be readily diverted out of the restaurant waste stream.

Figure 5 shows the percentage breakdown of the top five materials in relation to all other materials disposed by restaurants.

Figure 5



Service – Medical Health

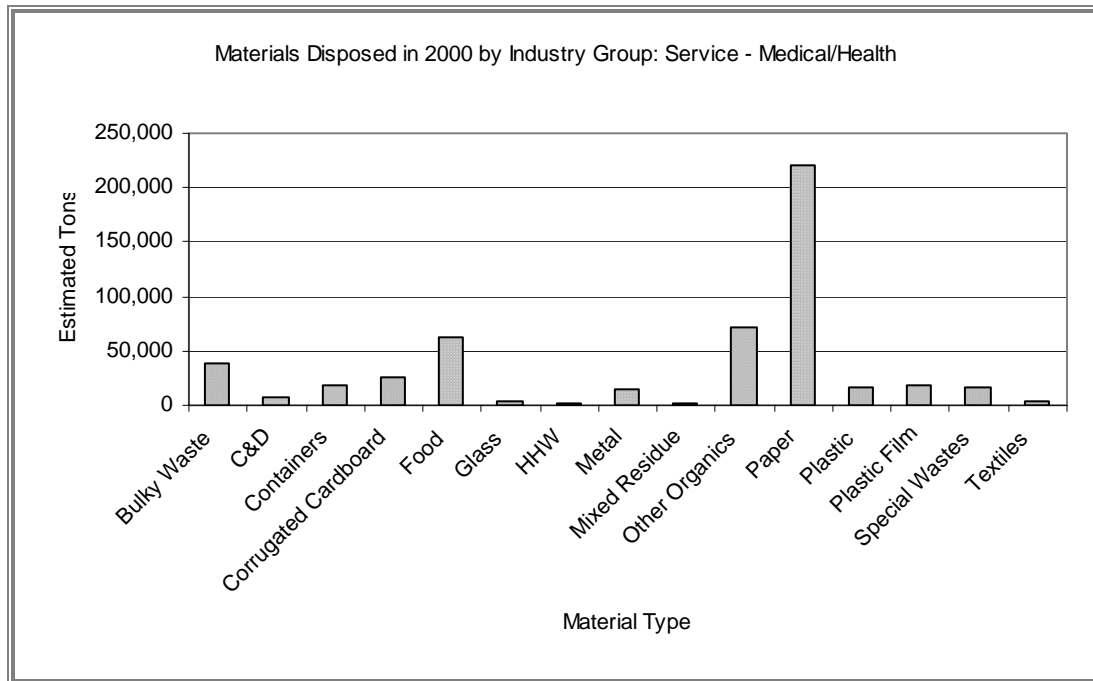
The industry group *Service – Medical/Health* employed 344,286 people in 2000 and disposed a total of 516,400 tons of materials. The top five materials that this industry group disposed were:

1. Paper: 220,000 tons
2. Other Organics¹⁰: 72,300 tons
3. Food: 62,500 tons
4. Bulky Waste: 38,200 tons
5. Corrugated Cardboard: 25,300 tons

Figure 6 shows the relation of the top five materials disposed to other all other materials found in this industry's waste stream.

¹⁰ Other organics includes leaves, trimmings, brush, and other yard waste.

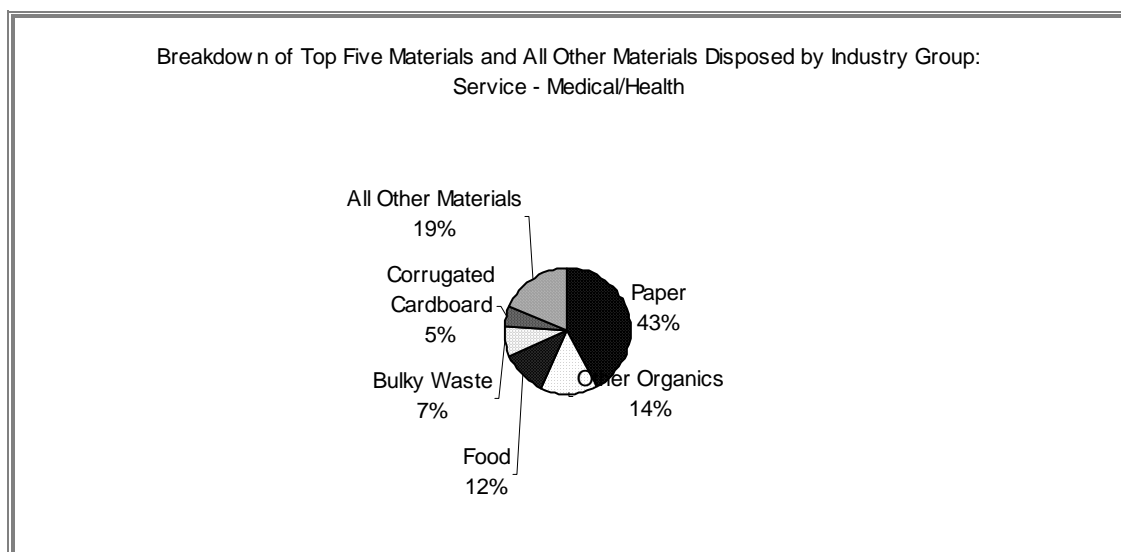
Figure 6



These top five materials made up 418,300 tons, or 81% of the estimated materials disposed in 2000 by this industry. Four of the top five materials disposed were organics and have the potential to be either composted or recycled. Paper and corrugated cardboard comprised 48% of the total materials disposed by the industry.

Figure 7 shows the percentage breakdown of the top five materials in relation to all other materials disposed by the industry group.

Figure 7



Service – Business Services

The industry group *Service – Business Services* employed 279,621 people in 2000 and disposed a total of 475,400 tons of materials. The top five materials that this industry group disposed were:

1. Paper: 162,600 tons
2. Textiles: 78,900 tons
3. Other Organics: 36,100 tons
4. Food: 32,800 tons
5. Metal: 32,800 tons

Figure 8 shows the relation of the top five materials disposed to all other materials found in this industry's waste stream.

These top five materials made up 343,200 tons, or 72% of the estimated materials disposed in 2000 by this industry group. All of the top five materials have the potential for increased recycling or composting. The appearance of textiles as a major waste stream component for this industry is unusual. Further study may clarify the types of textiles used (*e.g.*, promotional banners for interior and exterior wall hanging). Electronics were not separated out into a singular category but were included in the sub-material categories of remainder/composite metal or durable plastic (depending on the component – *e.g.*, outside shells, inside motherboards, etc.). Further study may help determine the potentially large amount of electronics included under these material categories.

Figure 8

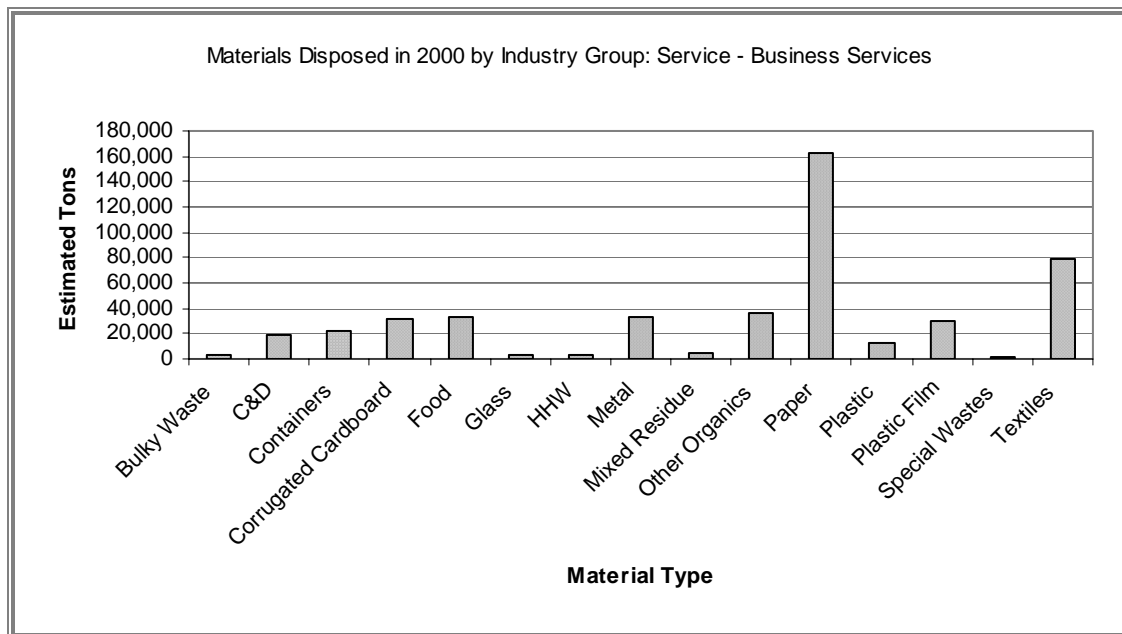
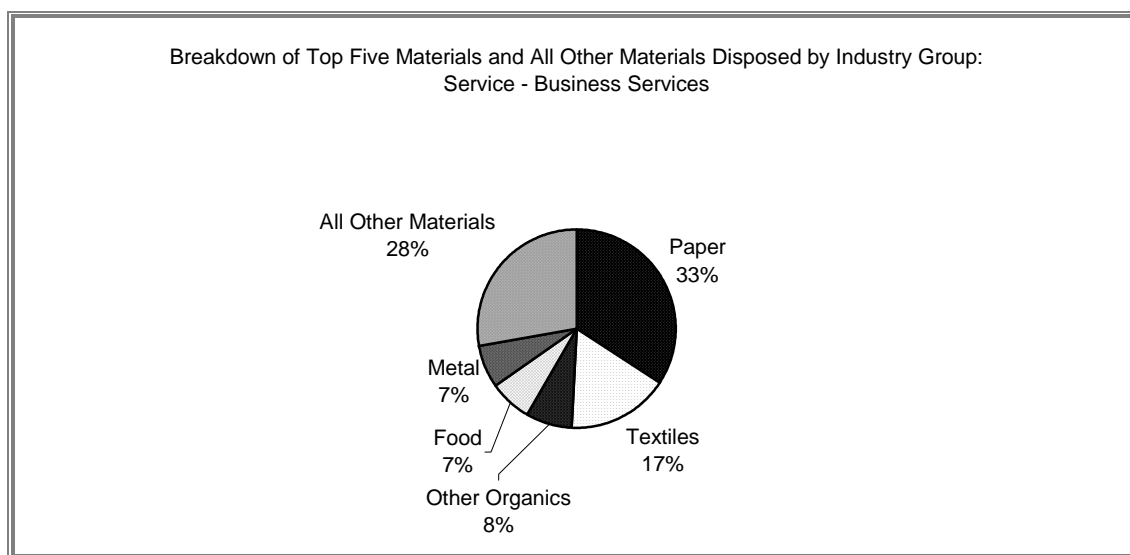


Figure 9 shows the percentage breakdown of the top five materials in relation to all other materials disposed by the industry group.

Figure 9

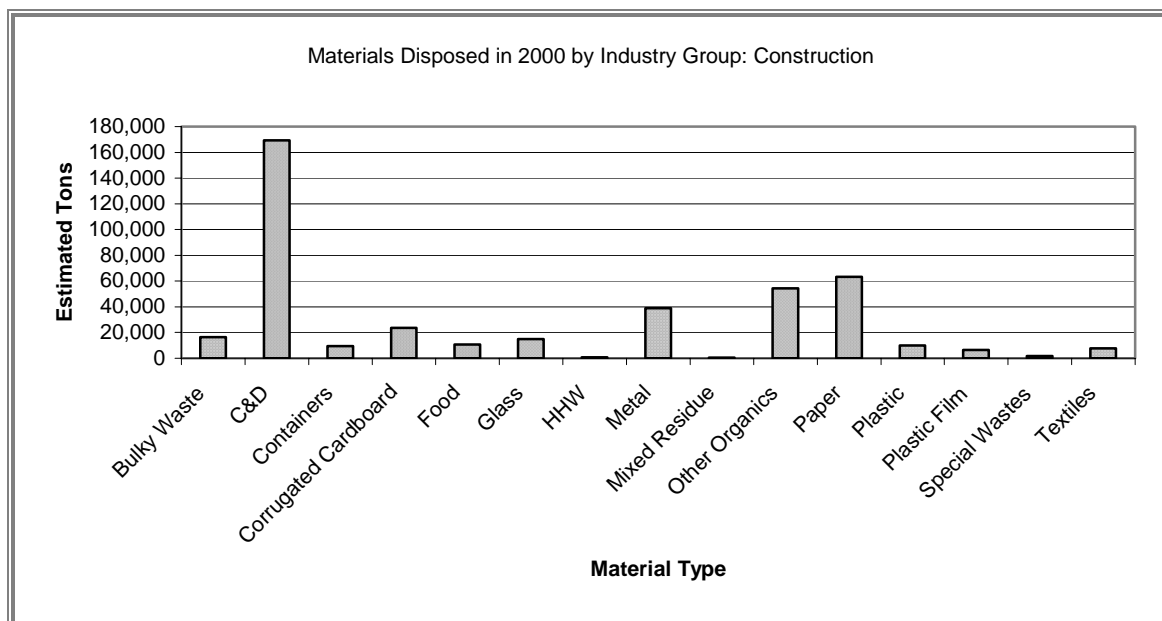


Construction

The industry group *Construction* employed 142,806 people in 2000 and disposed a total of 428,400 tons of materials. *Figure 10* shows the relation of the top five materials disposed to all other materials found in this industry's waste stream. The top five materials that this industry group disposed were:

1. C&D: 169,200 tons
2. Paper: 63,400 tons
3. Other Organics: 54,400 tons
4. Metal: 39,000 tons
5. Corrugated Cardboard: 23,600 tons

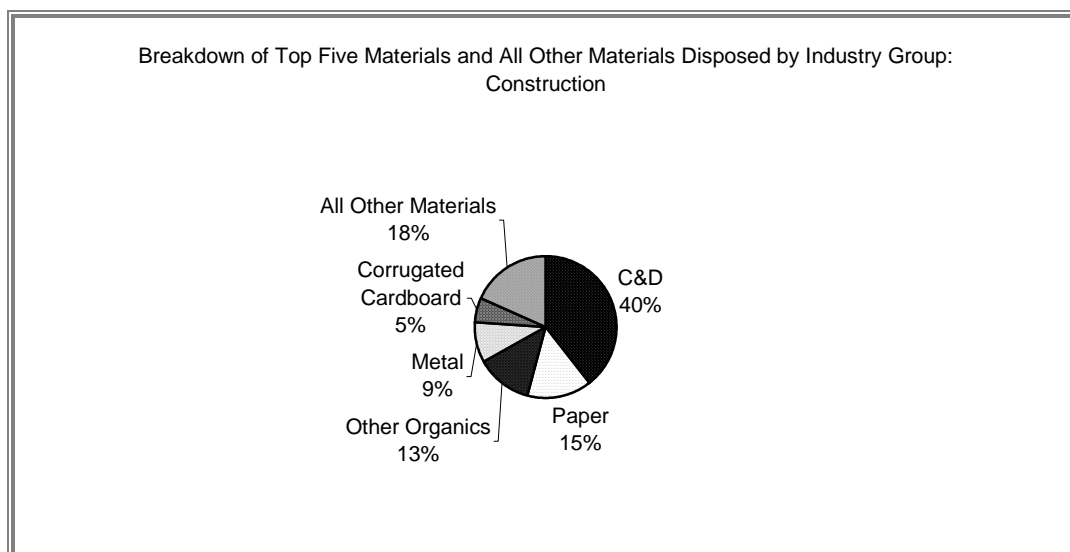
Figure 10



These top five materials made up 349,600 tons, or 82% of the estimated materials disposed in 2000 by this industry group. As seen with the other top five disposing industries, paper continued to be a large component of the materials waste stream. Other organics and corrugated cardboard were also large components of the construction industry's waste stream. DEP is conducting research and analysis of the C&D waste stream in preparation for developing regulations and guidance for an upcoming disposal ban on certain C&D materials.

Figure 11 shows the percentage breakdown of the top five materials in relation to all other materials disposed by the industry group.

Figure 11



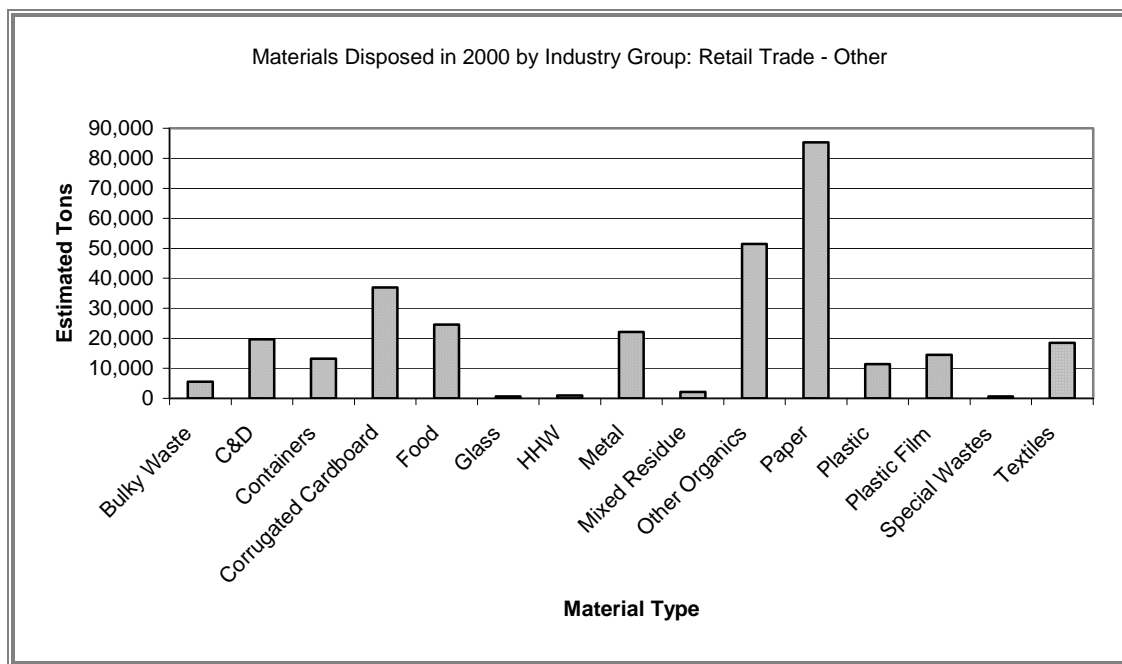
Retail Trade – Other

The industry group *Retail Trade - Other* employed 162,161 people in 2000 and disposed a total of 308,100 tons of materials. This industry group consists of three distinct retail businesses: apparel and accessory stores, miscellaneous retail, and furniture, home furnishings and equipment. The top five materials that this industry group disposed were:

1. Paper: 85,300 tons
2. Other Organics: 51,500 tons
3. Corrugated Cardboard: 37,000 tons
4. Food: 24,600 tons
5. Metal: 22,200 tons

Figure 12 shows the relation of the top five materials disposed to all other materials found in this industry's waste stream.

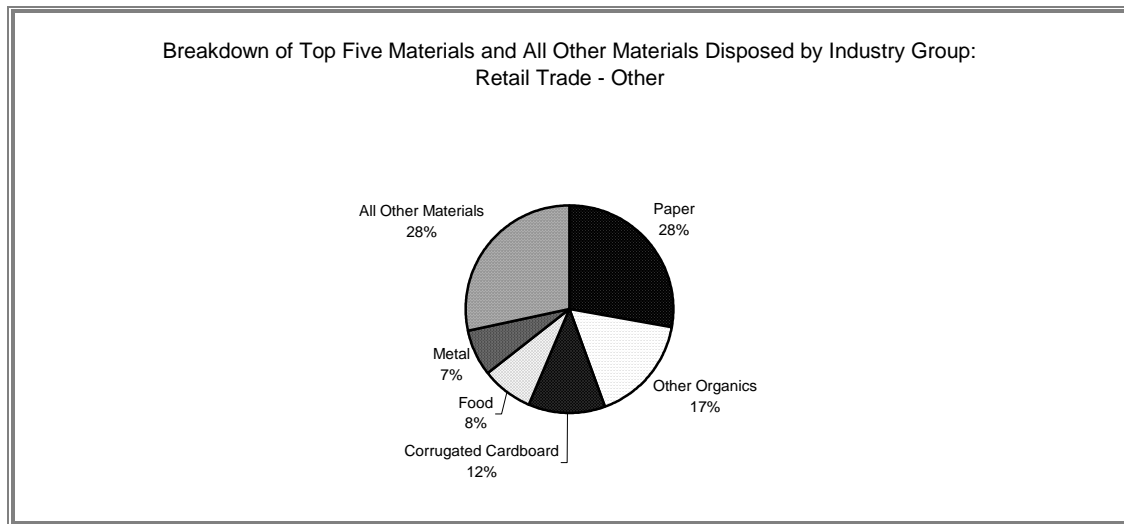
Figure 12



These top five materials made up 220,600 tons, or 72% of the estimated materials disposed in 2000 by this industry group. Paper and corrugated cardboard were two of the major material components for this industry. Further study may be needed for this industry group, especially in terms of the other organics component. This category includes leaf and landscaping materials and may be an overestimate for industry groups in Massachusetts because of the seasonal vegetation differences from California.

Figure 13 shows the percentage breakdown of the top five materials in relation to all other materials disposed by the industry group.

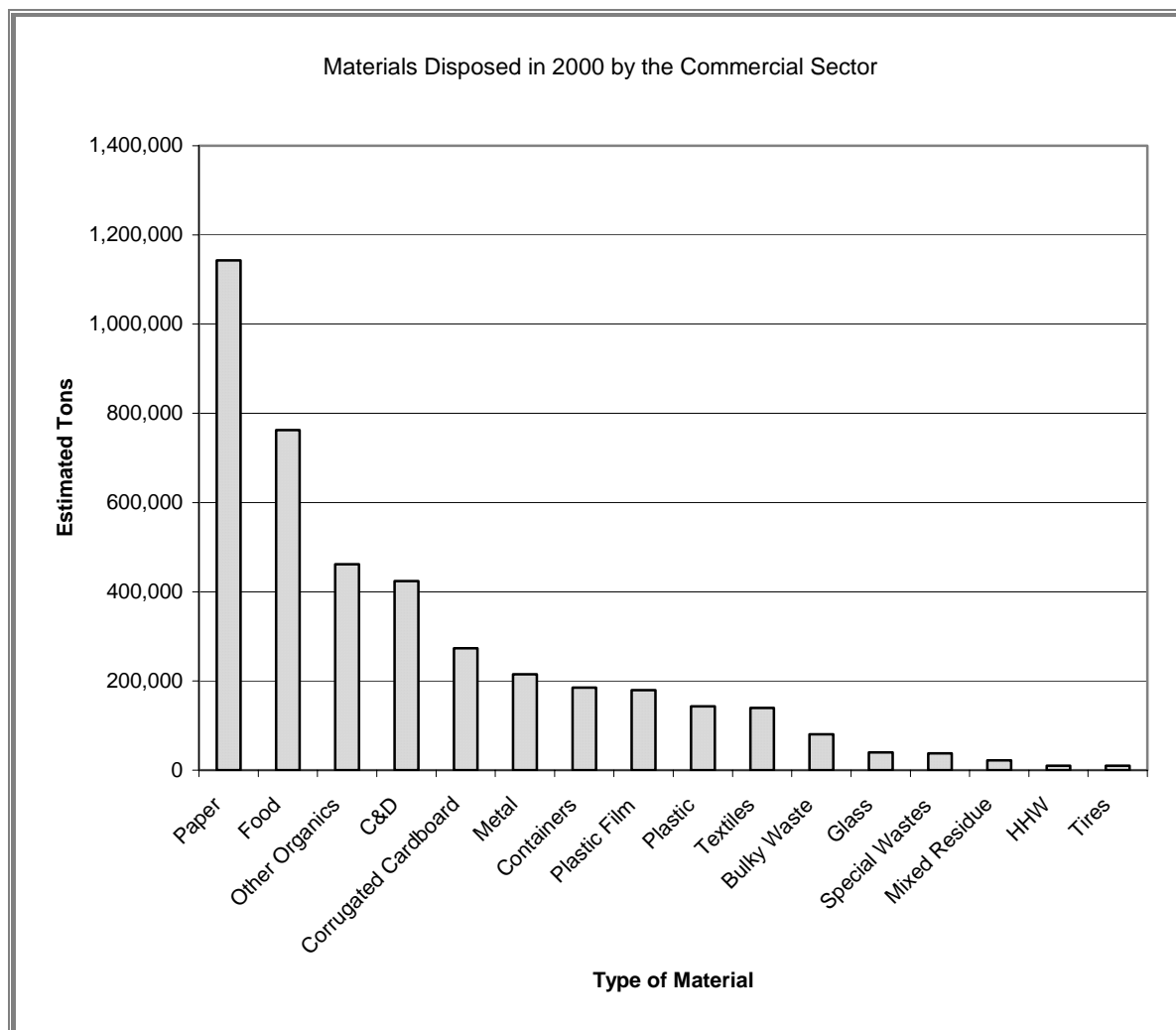
Figure 13



ANALYSIS BY MATERIAL CATEGORY

This section addresses commercial waste stream composition for 2000 by material category. *Figure 14* shows estimated statewide commercial disposal in 2000 by material category. The total amount disposed in 2000 by the commercial sector was estimated at 4,125,900 tons. Depending on how they are generated and handled, the top ten materials disposed in 2000 are potentially recyclable or compostable, and therefore could be diverted from the overall waste stream.

Figure 14



Top Five Materials

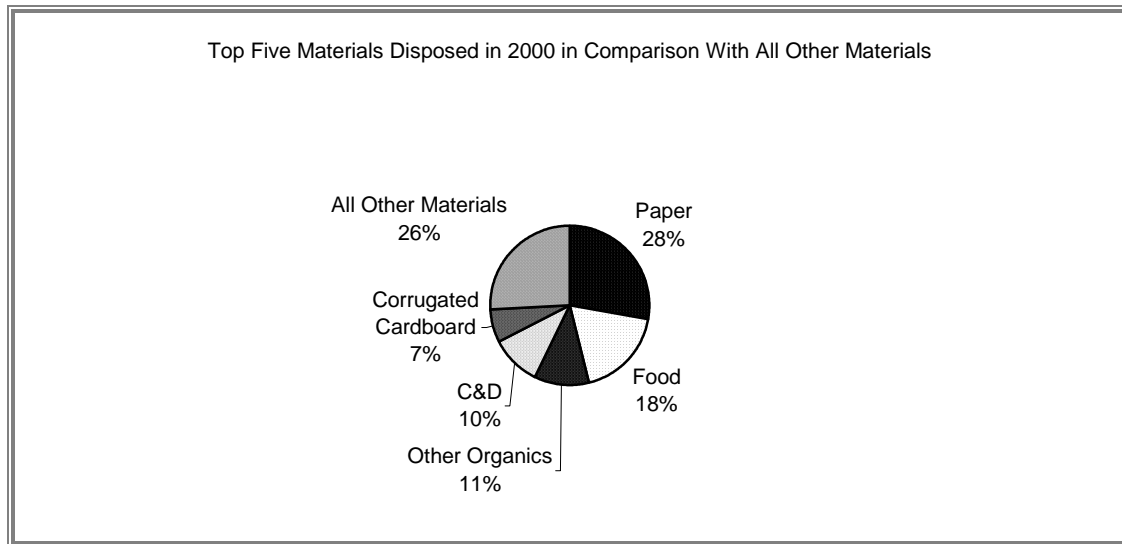
The top five materials disposed across all industries in 2000 were:

6. Paper: 1,143,100 tons
7. Food: 762,500 tons
8. Other Organics¹¹: 461,800 tons
9. C&D: 424,100 tons
10. Corrugated cardboard: 273,600 tons

¹¹ Other organics includes leaves, trimmings, brush, and other yard waste.

These top five materials made up 3,065,100 tons, or 74%, of the total materials disposed by the commercial sector in 2000. *Figure 15* shows a comparison of the top five materials disposed in 2000 in relation to all other materials.

Figure 15

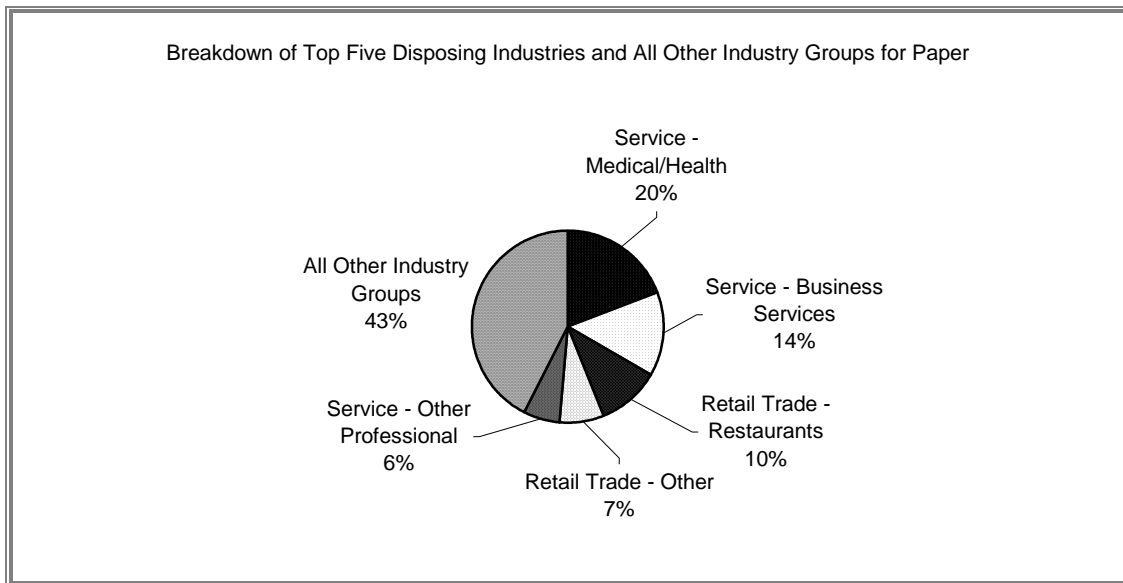


The following are summary profiles for the top five materials disposed by the commercial sector in 2000. These include a list of the five industry groups that are estimated to have disposed the most of each material category and the percentage breakdown of the top five industry disposal amounts in relation to the total tonnage of the particular material disposed.

Paper

| Top Five Industry Groups: | Total Tons Disposed: |
|---|----------------------|
| Service – Medical/Health | 220,000 |
| Service – Business Services | 162,600 |
| Retail Trade – Restaurants | 118,500 |
| Retail Trade – Other | 85,300 |
| Service – Other Professional | 72,000 |
| Total Amount: | 658,400 |
| Percentage of Total Tonnage for Material: | 57% |

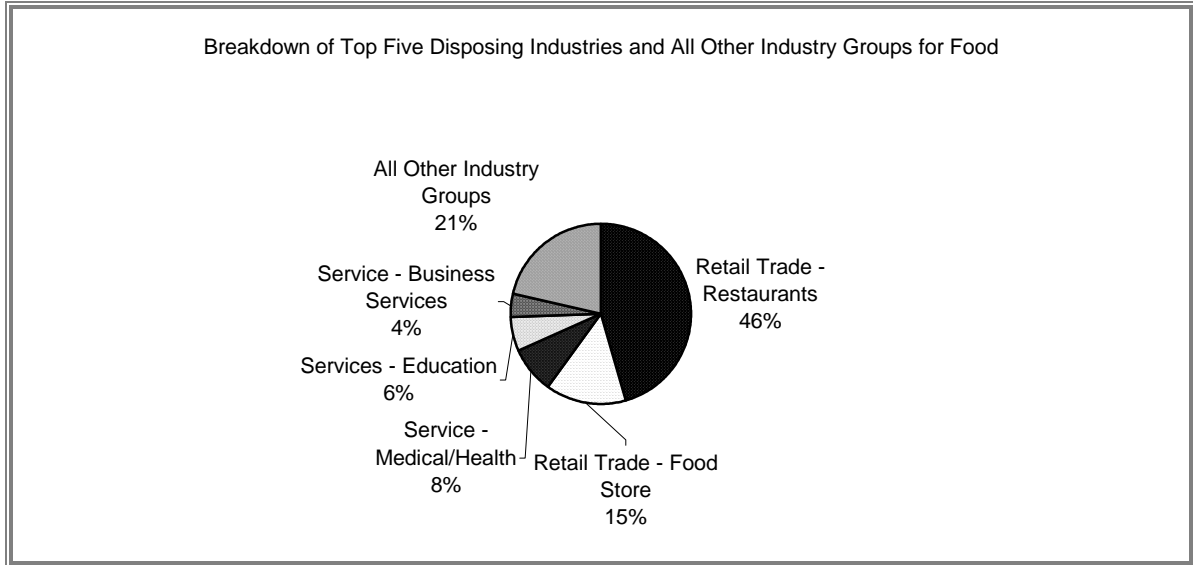
Figure 16



Food

| Top Five Industry Groups: | Total Tons Disposed: |
|---|----------------------|
| Retail Trade – Restaurants | 347,400 |
| Retail Trade – Food Stores | 110,700 |
| Service – Medical/Health | 62,500 |
| Service – Education | 47,000 |
| <u>Service – Business Services</u> | <u>32,800</u> |
| Total Amount: | 600,400 |
| Percentage of Total Tonnage for Material: | 79% |

Figure 17

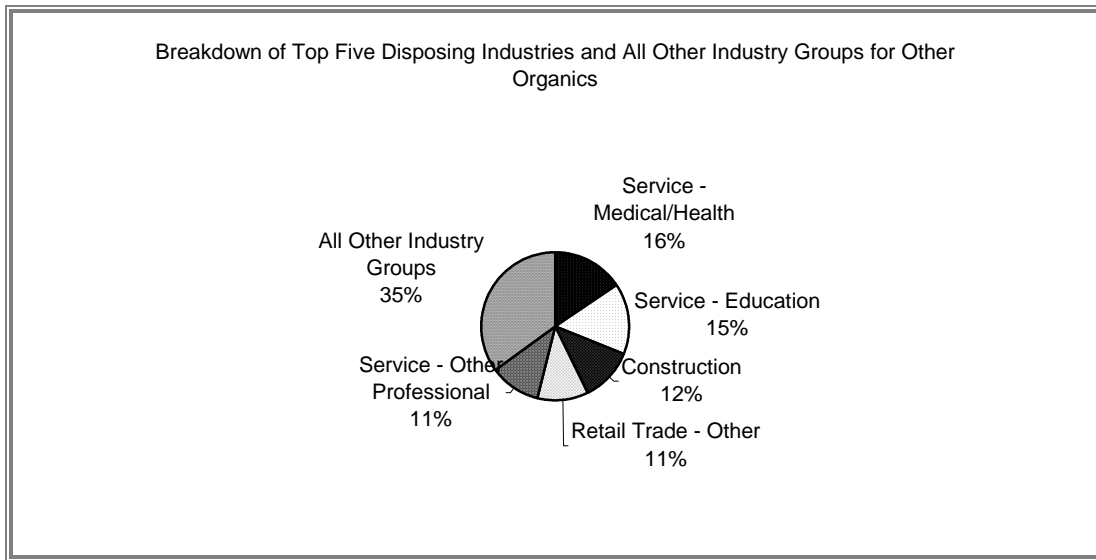


Other Organics

(Other Organics includes leaves, trimmings, brush, and other yard waste.)

| Top Five Industry Groups: | Total Tons Disposed: |
|---|----------------------|
| Service – Medical/Health | 72,300 |
| Service – Education | 71,000 |
| Construction | 54,400 |
| Retail Trade – Other | 51,500 |
| Service – Other Professional | 51,000 |
| Total Amount: | 300,200 |
| Percentage of Total Tonnage for Material: | 65% |

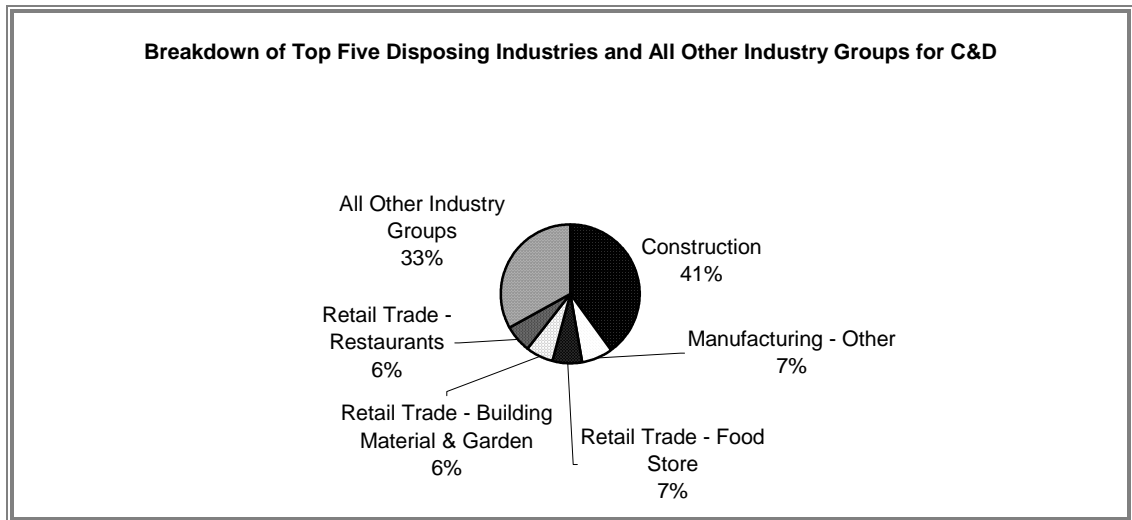
Figure 18



C&D

| Top Five Industry Groups: | Total Tons Disposed: |
|---|----------------------|
| Construction | 169,200 |
| Manufacturing – Other | 30,800 |
| Retail Trade – Food Store | 29,800 |
| Retail Trade – Building Material & Garden | 27,300 |
| <u>Retail Trade – Restaurants</u> | <u>27,300</u> |
| Total Amount: | 284,400 |
| Percentage of Total Tonnage for Material: | 67% |

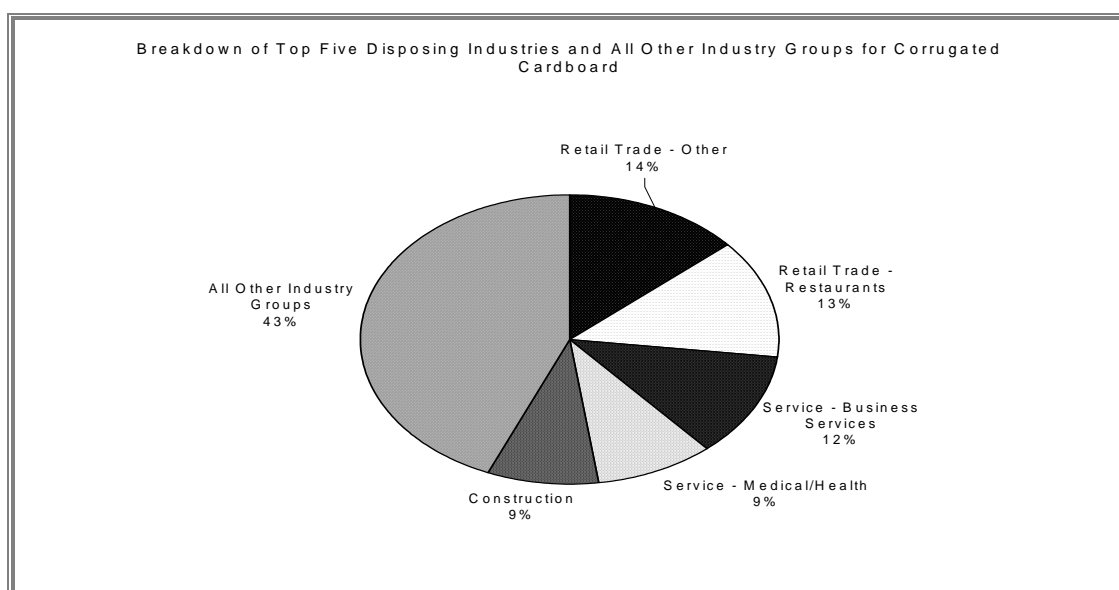
Figure 19



Corrugated Cardboard

| Top Five Industry Groups: | Total Tons Disposed: |
|---|----------------------|
| Retail Trade – Other | 37,000 |
| Retail Trade – Restaurants | 36,600 |
| Service – Business Services | 31,800 |
| Service – Medical/Health | 25,300 |
| <u>Construction</u> | <u>23,600</u> |
| Total Amount: | 154,300 |
| Percentage of Total Tonnage for Material: | 57% |

Figure 20



Top Ten Potential Target Areas for Waste Reduction

Table 1 shows the *Top Ten Potential Target Areas for Waste Reduction*. The information presented in *Table 1* is based on the total materials tonnage disposed in 2000 (an estimated 4,125,900 tons of material).¹²

Table 1 shows that these top ten target areas comprised 35% of the total materials disposed in 2000. Paper was the most disposed material type. Three industry groups, Restaurants, Medical/Health Services, and Business Services, were the top disposers of two material types, paper and food. This table highlights potential areas for DEP to further explore for the targeting of waste reduction programs in order to achieve the highest waste diversion results for DEP's limited resources.

¹² The amounts in this chart show the total estimated amount of that material type disposed of by that industry group for 2000. The “% of Total” column refers to the percent of the overall estimated commercial disposal.

Table 1

| Top Ten Potential Target Areas for Waste Reduction | | | |
|---|-------------------------------|---------------|-------------------|
| Material Type | Industry Group Name | Amount | % of Total |
| Food | Retail Trade - Restaurants | 347,400 | 8.4 % |
| Paper | Service - Medical/Health | 220,000 | 5.3 % |
| C&D | Construction | 169,200 | 4.1 % |
| Paper | Services - Business Services | 162,600 | 3.9 % |
| Paper | Retail Trade - Restaurants | 118,500 | 2.9 % |
| Food | Retail Trade - Food Store | 110,700 | 2.7 % |
| Paper | Retail Trade - Other | 85,300 | 2.1 % |
| Textiles | Services - Business Services | 78,900 | 1.9 % |
| Other Organics | Service - Medical/Health | 72,300 | 1.8 % |
| Paper | Services - Other Professional | 72,000 | 1.7 % |

COMPARISON BETWEEN THIS REPORT AND FIGURES REPORTED IN THE MASSACHUSETTS *BEYOND 2000* SOLID WASTE MASTER PLAN

In the 2000 Progress Report on the Beyond 2000 Solid Waste Master Plan, DEP calculated commercial generation and commercial diversion amounts by subtracting residential generation and diversion amounts, respectively, from statewide totals. Commercial disposal was then calculated by subtracting commercial diversion from commercial generation. Statewide construction and demolition debris amounts, which are primarily commercial, were calculated separately. These amounts for 2000 were as follows:

| | |
|---|-------------------------|
| Commercial MSW Generation | 4,860,000 tons |
| Commercial MSW Diversion (Recycling and Composting) | - <u>1,890,000 tons</u> |
| Commercial MSW Disposal | = 2,970,000 tons |
| C&D Disposal (in-state) | 660,000 tons |
| C&D Export | + 360,000 tons |
| C&D Import | - <u>40,000 tons</u> |
| Total C&D Disposed | = 980,000 tons |

| | |
|---------------------------|------------------|
| Commercial MSW Disposal | 2,970,000 |
| Total C&D Disposed | + <u>980,000</u> |
| Total Commercial Disposal | = 3,950,000 tons |

Based on these calculations, DEP calculated a total commercial disposal amount of 3,950,000 tons for calendar year 2000. In using the multipliers presented in CIWMB's 1999 study, we estimated that 4,125,900 tons of materials were disposed by the commercial sector in Massachusetts in 2000.¹³ The resulting difference between the two methods of estimating commercial waste disposal is approximately 175,900 tons/year. Since these two methods involve completely independent approaches and data sources for calculating commercial waste disposal, it is not surprising that there is a gap in the statewide figures calculated from each¹⁴.

Some of the potential factors that may contribute to differences between the two sources of data include:

- This report is based on extrapolating commercial waste composition data from California to Massachusetts. While we believe that this is a reasonable approach for most business sectors and materials, it is likely to be off for others, particularly organic wastes and C&D debris.
- This report makes no attempt to account for recycling, composting and other diversion, while the Master Plan includes both disposal and diversion data.
- Because the commercial disposal data is calculated indirectly for Master Plan purposes, it is dependent on a number of different data sources, including annual facility reports, recycling and C&D processor surveys, municipal data sheets, and import/export data from other states. Even small amounts of error within each of these data sources could add up to a large difference in the commercial disposal figure.
- In particular, it is likely that some of the disposal tonnage reported on municipal recycling data sheets is commercial disposal tonnage, despite attempts to exclude such tonnage from municipal reports. This may result in municipal disposal tonnage being overestimated and commercial disposal tonnage being underestimated in our Solid Waste Progress Report.
- Similarly, municipalities may not report all residential recycling tonnage, especially tonnage from multi-family housing and other residential subscription hauler customers. This would result in the Progress Report's commercial recycling tonnage being overestimated with respect to residential recycling, thereby underestimating the calculated commercial disposal tonnage.
- Municipalities may also not report all residential composting, since some of this material is handled by commercial landscapers and would, therefore, be counted as commercial composting in the Progress Report. This is another factor that could result in an underestimate of the Progress Report commercial disposal figure.

¹³ This estimate was generated for only total number of industry groups and businesses included in this analysis, therefore it does not provide a disposal estimate for 100% of the commercial sector in Massachusetts for 2000.

¹⁴ The 2-digit SIC business groups not covered by CIWMB and this Assessment are: Communications; Manufacturing – Primary/fabricated Metal; Manufacturing – Apparel/textile; Manufacturing – Furniture/fixtures; Services – Motion Pictures; Manufacturing – Chemicals/allied; Retail Trade – General Merchandise Stores; Mining; Transportation – Air; Utilities; Manufacturing – Paper/allied; Forestry; Agriculture/fisheries; and Manufacturing – Instruments/related.

The focus for both estimation methodologies is different. The main focus of DEP's *Master Plan and Progress Reports* is to calculate overall commercial waste generation, recycling, and disposal quantities for use in broad planning purposes. By contrast the main purpose behind the estimation methodology used in this Report is to provide a focus on materials and general estimated amounts disposed by commercial sector for specific materials. Estimating statewide commercial disposal is a secondary component of both of these approaches and a difference in the statewide commercial disposal figures between the two does not significantly detract from the utility of either. The industry-specific estimated waste composition presented in this Report can help DEP advance commercial waste reduction program planning in ways that the data contained in the Solid Waste Progress Report cannot. Similarly, the Progress Report data enables DEP to calculate Massachusetts-specific waste reduction rates and disposal capacity projections in ways that this Commercial Disposal Assessment cannot support.

SUMMARY

This assessment has provided the reader with information on commercial sector material disposal rates and estimated amounts. When newer employment data becomes available, the analysis and the data located in the attached *Appendices* can be updated and DEP can begin to determine waste disposal trends over time for both industry groups and specific materials. This assessment was based on employment data and was focused on waste disposed, thus it did not account for previous waste diversion activities by individual businesses prior to the disposal of their wastes; nor does it account for any source reduction activities for products used and disposed by the commercial sector. The numbers are estimates based on multipliers developed by CIWMB in conjunction with Massachusetts-specific employment information. Therefore while the numbers are helpful for broad program planning purposes, they should not be relied upon for specific program development.

Areas for Further Research and Analysis

This Assessment provides a good basis for planning and targeting commercial waste reduction programs and resources on a statewide level (e.g., should DEP focus more on restaurants or office buildings? More on food waste or plastic film?). However, more specific information will be needed to inform and support the development of specific programs in specific locations (e.g., if we want to establish an office paper recycling cooperative in one municipality, we would need more specific local information on employment, business activities, disposal/recycling contract and service arrangements, etc.).

Similarly, if DEP wants to target a specific material category for further waste reduction, DEP may want to conduct further research, since this analysis does not provide detailed data for all material categories (e.g., electronics are not broken out specifically). In addition, some material categories, such as construction and demolition debris and leaves, yard waste, and brush, may vary widely between California and Massachusetts. DEP is already conducting a separate analysis on generation of food waste, which will better inform our efforts to reduce and divert this large portion of the commercial waste stream from disposal. Additional work currently being performed by the Tellus Institute for DEP will help to refine our understanding of the commercial waste stream by developing a comprehensive view of diversion and waste generation across both the commercial and residential sectors.